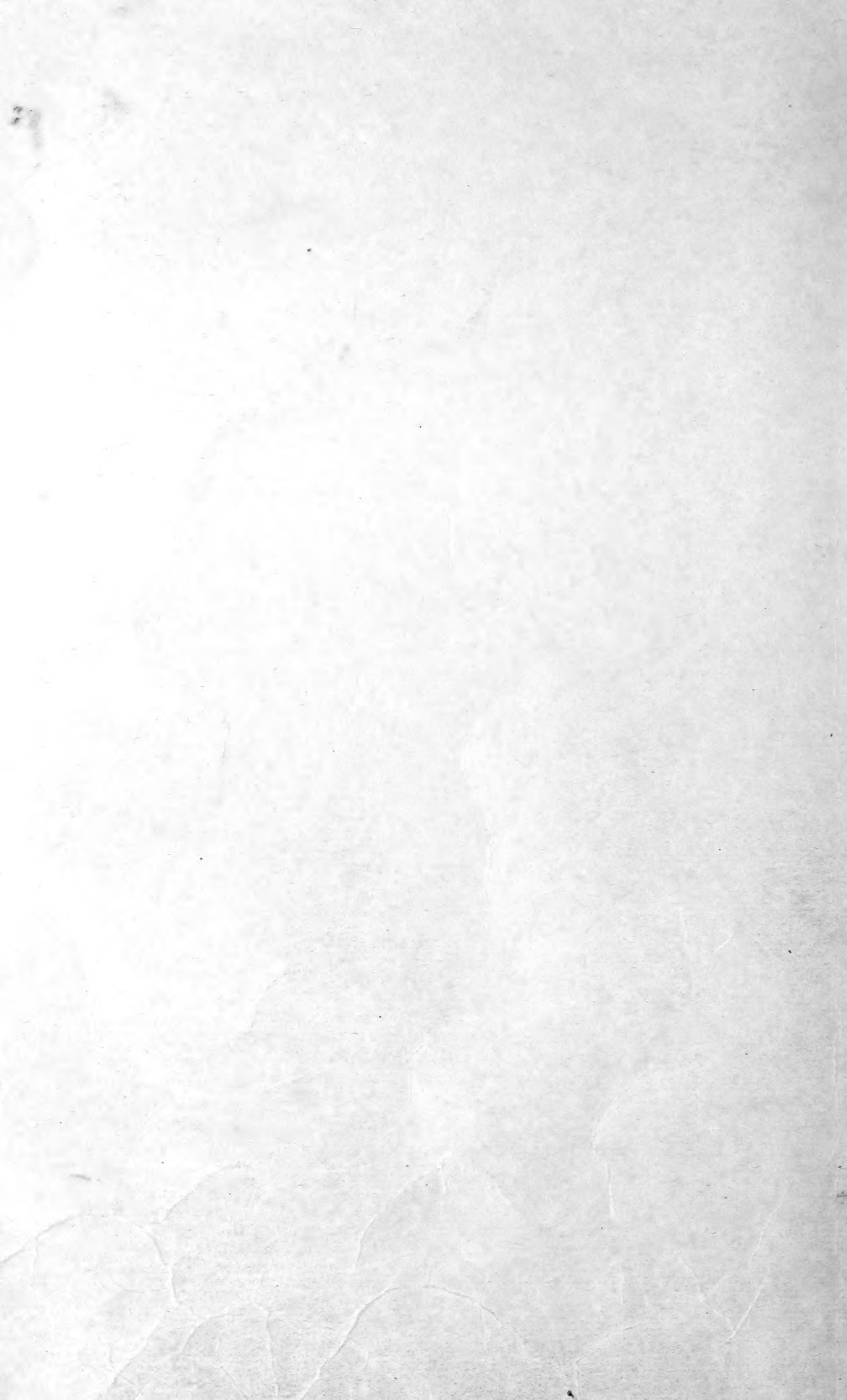


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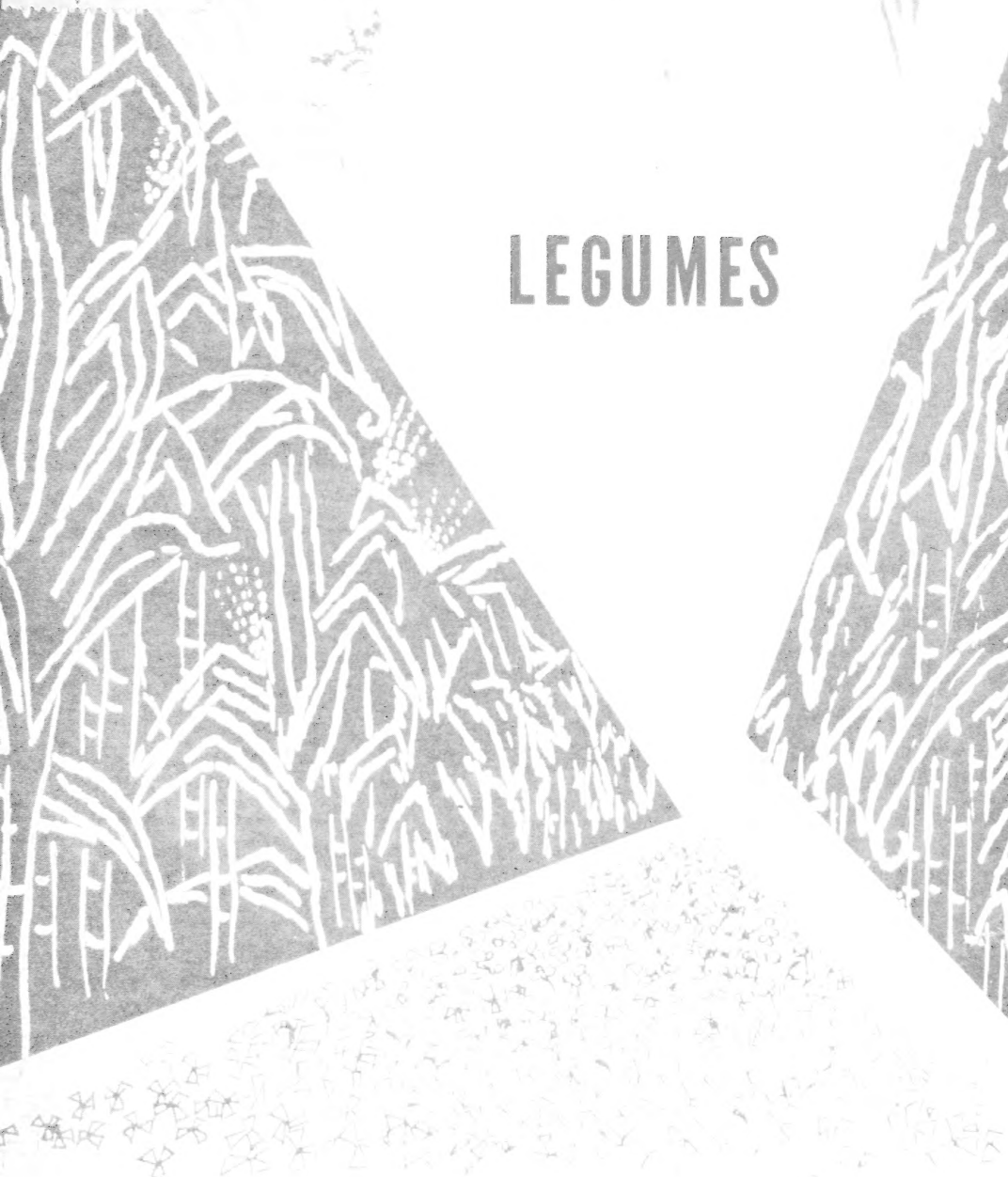
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U. S. DEPARTMENT OF AGRICULTURE

# LEGUMES



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*Interseeding legumes and grasses in wide-row corn is a promising new practice for farmers in the Corn Belt. The corn serves as a nurse crop for establishing green manure and meadow crops. Traditionally, cereal grains have served this purpose.*

*Success with this practice, however, can be assured only when there is adequate soil moisture. Otherwise, results may be disappointing.*

by C. A. Van Doren and O. E. Hays,

Soil and Water Conservation Research Division,

Agricultural Research Service

## BENEFITS FROM INTERSEEDING

Using corn as the nurse crop offers more benefits than the conventional practice of seeding in grain.

### Less Erosion Loss

Erosion losses from fields planted to small grain have been severe in some parts of the Corn Belt. At the Dixon Springs (Ill.) Experiment Station, soil losses from plots of winter wheat were greater than from plots of corn. At the La Crosse Soil and Water Conservation Station, Wis.,<sup>1</sup> plots in spring grain lost twice as much water in runoff as land in corn following hay. Soil losses were two and one-half times as heavy.

In addition, a vigorous cover crop between the corn rows helps greatly to control erosion in the corn.

### More Feed Value

Either corn or hay produces more feed per acre than small grain. Corn yielding 100 bushels per acre produces about 5,200 pounds of TDN (total digestible nutrients). In contrast, oats yielding 75 bushels

per acre produces only about 1,700 pounds of TDN as grain and 2,500 pounds as silage or hay. Alfalfa yielding 4 tons per acre produces about 4,100 pounds of TDN.

## CORN TILLAGE

### Row Spacing

Corn must be planted in rows spaced wider than normal. Sparse stands and poor survival of interseeded legumes and grasses are frequent when the interseeding is made in narrow-spaced rows (40 or 42 inches). Insufficient light in the narrow rows may be a factor. Corn in narrow-spaced rows also depletes the available soil moisture.

For interseeded green manure crops, corn rows may be spaced 60 to 80 inches apart, or spaced alternately at 40 and 80 inches. (Alternate spacing is the same as omitting every third row in a normal 40-inch row planting system.) Good stands can be expected in the 60- and 80-inch rows. With the other plan, poorer stands can be expected in the 40-inch rows.

A row spacing of 60 or 80 inches is recommended when interseeding for hay production.

The exact row spacing may depend on the type of equipment available.

<sup>1</sup> Agricultural Research Service, U. S. D. A.



A midsummer stand of interseeded alfalfa.

(Courtesy of Ohio Agricultural Experiment Station)

Tests in Illinois and Iowa showed that north-south rows gave better legume stands than east-west rows. North-south rows help to give the seedlings a more uniform distribution of light. In east-west rows, legume seedling mortality was higher in the sunny areas. Either high soil temperature at the surface or drying out of the soil moisture may have caused this loss.

Corn row direction has had little influence on legume survival in Wisconsin, even when interseedings were made at corn planting time.

#### Procedures

Interseeding for a green manure crop requires no special tillage practices.

Interseeding for a hay crop requires that the cultivator be adjusted to prevent excessive ridging of the soil at the corn row. Good weed control can be obtained with a minimum of ridging.

Minimum tillage may be used in planting corn that is to be interseeded. The wheel-track planting method is becoming more popular, and has been particularly effective in Wisconsin.

For wheel-track planting, plow the land at planting time. Plant the corn on the plowed soil without additional seedbed preparation. Adjust the tractor wheel and planter spacing so that the corn is planted in the wheel tracks.



An early autumn stand of interseeded alfalfa.

(Courtesy of Ohio Agricultural Experiment Station)

Delay the first cultivation until the corn is about 6 inches tall. This cultivation fills in the depression in which the corn was planted. Two cultivations should be enough for good weed control.

Conventional tillage—plow-disk-drag harrow—may also be used when legumes and grasses are interseeded in corn. Attach furrow openers to the planter shoes. These openers make it possible to plant the corn in shallow furrows similar to those made by wheel-track planting. This makes weed control easy and causes a minimum of ridging.

### Yields

Most experiment stations in the North Central States have reported slight reductions in yields when corn is planted in wide rows.

Yields in Wisconsin from test plots of 60-inch rows were 10 percent less than from 40-inch rows. Alternate rows of 40 and 80 inches brought a 20-percent reduction in yield.

In Illinois the 60-inch row yielded 8 percent less; 80-inch rows, 20 percent; and alternate 40- and 80-inch rows, 10 percent.

But there is one significant point to remember in using wide-row corn for interseeding: Even a 65-bushels-per-acre corn yield produces more feed than oats at 75 bushels per acre. The oats would contain about 1,700 pounds of total digestible nutrients; the corn, 3,400 pounds.

To obtain maximum yields from wide-spaced rows, you should plant corn at about the same rate per acre as recommended for normal row spacing.



Wide rows are essential for proper growth of the interseeded legumes.  
(Courtesy of Funk Bros. Seed Co.)

## LEGUME PLANTING

Seeding procedures for legumes and grasses vary within the Corn Belt. These variations depend on rainfall distribution, soil moisture levels, soil temperatures, and whether the interseeding is to be used as green manure, hay, or pasture. Seedlings have a better chance to survive if the planting is done before or shortly after corn planting time, particularly where a weed problem is unlikely. Moreover, regular equipment can be used at that time.

Early seeded legumes and grasses, however, are more likely to become weedy and will reduce corn yields more than seedings made in June or July. Early seedings need to be clipped or sprayed to reduce weed growth and to reduce competition with corn for moisture and nutrients.

Seedings delayed until the corn is cultivated twice will have less weed competition. However, soil moisture conditions at this time are less favorable, and special soil-packing equipment is necessary to insure good stands of legumes.

Two types of soil-packing machines are available: A grain drill with attached packing wheels, and the cultipacker seeder. Both machines pack the soil firmly around the small seed. This allows the seed to make maximum use of the available moisture for germination and growth.

Band seeding is an excellent method for establishing legumes and grasses in wide-row corn. This procedure deposits the seeds in a row over a band of fertilizer and covers them with a thin layer of soil. Most conventional grain drills can be adapted to this method

by installing a band seeding attachment. Manufactured kits are available.

Research tests in Illinois, Ohio, and Wisconsin show alfalfa is the best crop for interseeding in corn. Sweet clover, red clover, and Ladino clover rate progressively poorer.

Seven different crops were tried at the Joliet, Ill., Soil and Water Conservation Station.<sup>2</sup> Early-seeded stands of alfalfa, red clover, mammoth clover, and Ladino clover were about the same in quantity. Winter vetch and rye seeded about the first of August produced good stands.

High soil fertility is necessary to obtain satisfactory yields of corn and to insure good survival of interseeded legumes and grasses. Soil tests are imperative. Generally, the kinds and amounts of fertilizers should be the same as used when seeding with small grain.

## WEED CONTROL

Controlling weeds in the corn crop and in the interseeded crop is most essential. Excessive weed growth can kill an interseeding. By delaying the planting of legumes until after the second cultivation, you can destroy several crops of weeds by the customary tillage operations.

If weeds become a problem, control them by clipping or by applying chemicals.

A mower mounted on a small

tractor can do the clipping job satisfactorily without injuring the corn. Set the mower high enough so that the weeds are cut above the tops of the legume plants.

Experimental results to date show that CDAA and other materials may prove practical as a pre-emergence treatment for grass control in interseeded legumes. Postemergence applications of 2, 4-DB on broadleaf weeds at the 4-leaf stage of the alfalfa have given satisfactory control in research trials. Tests are being continued to determine safe rates of application for all conditions.

Consult your county agricultural agent or Extension specialist for the latest information and recommendations most applicable to your soil and climatic conditions, as based on the most recent tests in your State.

## FORAGE USE

Interseeded legumes may be used the following year for hay or pasture. Most North Central States report good results with interseeded crops used as meadow and hay crops. In Wisconsin and Michigan, yields of forage established by interseeding in corn are about 0.2 ton per acre less than yields of forage established by seeding in small grain. This difference is largely the result of poorer stands of legumes at the corn row.

Interseeded legumes may also be used as a green manure crop for enriching the soil. Most States report worthwhile stands when the legumes are seeded in wide-row corn after the second cultivation.

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<sup>2</sup> Agricultural Research Service, U. S. D. A.



A 1-year-old stand of alfalfa planted by the interseeding method.  
(Courtesy of University of Wisconsin)

## EROSION CONTROL

Interseeding legumes in corn permits the use of a corn-hay rotation. At the La Crosse Soil and Water Conservation Station, Wis., a rotation of corn-hay was much more effective in controlling erosion than a rotation of corn-grain-hay. In a corn-hay rotation, the land is open only from the time of plowing for corn until the seeding has become well established in the corn. The land is well protected during the

late summer, winter, and spring months.

Erosion control is even better when interseeding is combined with wheel-track planting of corn. This system protects the land with a meadow crop right up until corn planting time. The plowed land is in a rough, highly absorptive condition until the first cultivation of corn. Interseedings give the land a good protective cover after the first of August. This system protects the land with a dense cover except during June and July.